

CLAIMS

1. (currently amended) A biocompatible tissue-bonding adhesive composition comprising:
a polyol of functionality N, wherein said polyol ~~being~~ is terminated with at least one polyisocyanate, said terminated polyol being in solution, wherein ~~with~~ at least (N-1)% of said solution ~~comprising~~ comprises free polyisocyanate, and wherein at least about 70% of the polyol is derived from ethylene oxide monomers.
2. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 1 wherein N is in the range 1.5 – 8.
3. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 1 wherein said polyol is a branched polypropylene oxide/polyethylene oxide copolymer.
4. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 3 wherein said polypropylene oxide/polyethylene oxide copolymer contains ~~polypropylene~~ propylene oxide units in a range of about 10% to about 30% by number.
5. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 3 wherein said polypropylene/polyethylene oxide copolymer contains no more than about 10% polypropylene oxide.
6. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 1 wherein said polyisocyanate is comprised of a 80:20 mixture of 2,4- toluene diisocyanate and 2,6-toluene diisocyanate.
7. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 1 wherein said polyisocyanate ~~consists of~~ comprises 2,6-toluene diisocyanate.
8. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 1 wherein said polyisocyanate ~~consists of~~ comprises isophorone diisocyanate.

9. (currently amended) The biocompatible~~biocompatible~~ composition as recited in claim 1 wherein said polyisocyanate ~~consists of~~ comprises an 80:20 mixture of 2,4- toluene diisocyanate and 2,6-toluene diisocyanate and about 3% of the composition is free polyisocyanate.
10. (currently amended) The biocompatible~~biocompatible~~ composition as recited in claim 1 wherein said polyisocyanate ~~consists of~~ comprises isophorone diisocyanate and about 1.5% of said composition of free polyisocyanate.
11. (currently amended) The biocompatible~~biocompatible~~ composition as recited in claim 1, wherein said composition is comprised of two polyisocyanates and wherein one of said polyisocyanates comprises a free isocyanate B as an aromatic polyisocyanate and the other of said polyisocyanates comprises an aliphatic isocyanate A which is used to endcap said copolymer.
12. (currently amended) The biocompatible~~biocompatible~~ composition as recited in claim 11 wherein the free isocyanate B converts to an amine faster than the isocyanate A.
13. (currently amended) The biocompatible~~biocompatible~~ composition as recited in claim 11 wherein said free isocyanate B is more reactive with nitrogenous substances than said isocyanate A.
14. (currently amended) The biocompatible~~biocompatible~~ composition as recited in claim 11 wherein said free isocyanate B is of lower viscosity than said isocyanate A.
15. (cancelled)
16. (cancelled)
17. (currently amended) A biocompatible adhesive composition comprising at least two branched polyols wherein at least one of said polyols is a branched polypropylene oxide/polyethylene oxide copolymer, and wherein at least one of said branched polyols consists of a copolymer of less than 10% polypropylene oxide and ~~another~~ at least one of said branched polyols comprises a copolymer consisting of between about 10 and about 30% polypropylene oxide, both of said copolymers of functionality 1.5-8, said copolymers being terminated with at least one polyisocyanate, said terminated

copolymers being in solution with , and wherein at least 1% of said solution ~~comprising~~ comprises free polyisocyanate.

18. (currently amended) The ~~biocompatible~~ biocompatible composition as recited in claim 17 wherein one of said polyol copolymers ~~consists of~~ comprises about 5% polypropylene oxide and the other of said polyol copolymers ~~consists of~~ comprises about 25% polypropylene oxide.
19. (currently amended) The ~~biocompatible~~ biocompatible composition as recited in claim ~~17~~ 20 wherein said copolymer having a lesser functionality ~~comprises at least 25% by molecular number of the number of polymer molecules~~ comprises at least 25% by molecular number of the number of polymer molecules of the total copolymer component.
20. (currently amended) The ~~biocompatible~~ biocompatible composition as recited in claim ~~15-17~~ wherein one of said copolymers has a lesser functionality ~~less than one or more of the other~~ of said copolymers.
21. (currently amended) The ~~biocompatible~~ biocompatible composition as recited in claim 20 wherein one of said copolymers has functionality 2 and the other of said copolymers has functionality 3.
22. (currently amended) The ~~biocompatible~~ biocompatible composition as recited in claim 20 wherein said copolymer of lesser functionality is less than 25% ~~by molecular number of the number of polymer molecules~~ by molecular number of the number of polymer molecules of the total copolymer component.
23. (currently amended) The ~~biocompatible~~ biocompatible composition as recited in claim 22, wherein one polyol is terminated with a polyisocyanate ~~with water reactivity~~ having a first reaction rate with water R1 and another polyol is terminated with a polyisocyanate ~~with water reactivity~~ having a second reaction rate with water R2, where R1 [[>]] is a faster rate than R2, both of said terminated polyols having an average [[of]] functionality of 1.5-8, said terminated polyols being in ~~-solution~~ a solution, with at least 1% of said solution comprising free polyisocyanate of reactivity R1.
24. (currently amended) The biocompatible composition as recited in claim 23 wherein one of said polyols is terminated with an aromatic polyisocyanate and another of said polyols is terminated with an aliphatic polyisocyanate, both of

said polyols having an average [[of]] functionality of 1.5-8, said terminated polymers being in solution ~~solution~~, with wherein at least 1% of said solution ~~comprising~~ comprises free polyisocyanate.

25. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 24 wherein said free polyisocyanate is aromatic.
26. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 25, wherein said free polyisocyanate ~~is comprised of~~ comprises toluene diisocyanate.
27. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 25, wherein said free polyisocyanate consists of ~~isomer~~ one or more isomers of 2,6-toluene diisocyanate.
28. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 23, wherein said composition eliminates any aromatic amines ~~during polymerization~~ induced by reaction of water or proteins with aromatic isocyanates during polymerization, said elimination occurring by reaction of such aromatic amines with less-reactive aliphatic isocyanates capping polyols, where the number of groups of said less reactive isocyanate capped polyol is present in essentially stoichiometric amounts with respect to said the number of groups of said aromatic isocyanates.
29. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 28, wherein said less reactive isocyanate ~~used to cap~~ capping said polyol comprises isophorone diisocyanate.
30. (currently amended) The biocompatible ~~biocompatible~~ composition as recited in claim 29, wherein said polyol is about 75% polyethylene oxide and about 25% polypropylene oxide by number of residues.

31 - 39 (cancelled)

40 (currently amended) A biocompatible tissue-bonding adhesive composition comprising:

a polyol of functionality N, wherein said polyol being terminated with at least one polyisocyanate in solution with at least (N-1)% of said solution comprising free polyisocyanate, wherein said adhesive composition is essentially anhydrous at the time of its application to tissue.

41. (currently amended) The ~~biocompatible~~ biocompatible composition as recited in claim 40 wherein N is in the range 1.5 – 8.

42. (currently amended) The ~~biocompatible~~ biocompatible composition as recited in claim 40 wherein said polyol is a branched polypropylene/poly-ethylene oxide copolymer.

43. (currently amended) The ~~biocompatible~~ biocompatible composition as recited in claim 42 wherein said polypropylene/polyethylene oxide copolymer contains polypropylene oxide in a range of about 10% to about 30%.

44. (currently amended) The ~~surgical~~ biocompatible adhesive of claim 40 wherein the adhesive is a one-part adhesive consisting essentially of at least one NCO-terminated branched polymer, derived from at least one ~~organic~~ polymeric ~~polyisocyanate~~ polyisocyanate, and at least 1% unreacted low molecular weight ("free") polyisocyanate ~~polyisocyanate~~, ~~wherein the polymerization proceeds by the following time-ordered steps:~~ wherein the adhesive is characterized in having a reactivity such that

- 1) free polyisocyanate bonds to tissue,
- 2) said free polyisocyanate converts to a polyamine and links said NCO-terminated branched polymer to said tissue bonded polyisocyanate;
- 3) said free polyisocyanate converts to polyamine and links said branched polymer to other said same polymers.

45. (currently amended) The ~~surgical~~ biocompatible adhesive of claim 40 wherein the adhesive is a one-part adhesive consisting essentially of two NCO-terminated branched polypropylene/poly-ethylene oxide copolymers, wherein copolymer A is at most 10% polypropylene oxide and copolymer B is between 10% and 30% polypropylene oxide, derived from ~~an organic~~ a polymeric polyisocyanate and at least 1% unreacted low molecular weight ("free") polyisocyanate ~~wherein the polymerization proceeds by the following time-ordered steps:~~ wherein the adhesive is characterized in having a reactivity such that

- 1) free polyisocyanate bonds to tissue,
- 2) said free polyisocyanate converts to a polyamine and links both polypropylene/polyethylene oxide copolymers to said tissue bonded polyisocyanate,
- 3) said free polyisocyanate converts to polyamine and links said branched polypropylene/polyethylene oxide copolymers to other said same polymers, and
- 4) polymerized copolymer A swells within the formed polymer matrix and causes degradation of the formed matrix.

46. (currently amended) The ~~surgical~~ biocompatible adhesive of claim 40, wherein the adhesive is a one-part adhesive consisting essentially of two NCO-terminated branched polypropylene/poly-ethylene oxide copolymers, wherein copolymer A is at most 10% polypropylene oxide and copolymer B is between 10% and 30% polypropylene oxide, derived from ~~an organic~~ a polymeric polyisocyanate and at least 1% unreacted low molecular weight ("free") polyisocyanate ~~wherein the polymerization proceeds by the following time-ordered steps:~~ wherein the adhesive is characterized in having a reactivity such that

- 1) free polyisocyanate bonds to tissue,
- 2) said free polyisocyanate converts to a polyamine and links copolymer B preferentially to said tissue bonded polyisocyanate,
- 3) said free polyisocyanate converts to polyamine and links said branched polypropylene/polyethylene oxide copolymers to other said same polymers,

- 4) polymerized copolymer A swells within the formed polymer matrix and causes degradation of the formed matrix, and
- 5) polymerized copolymer B does not swell at the tissue/matrix interface and does not cause tissue bond degradation.

47. (currently amended) The ~~biocompatible-biocompatible~~ composition as recited in claim 40, wherein one polyol is terminated with a polyisocyanate ~~with water reactivity~~ having a first reaction rate with water R1 and another polyol is terminated with a polyisocyanate ~~with water reactivity~~ having a second reaction rate with water R2, where $R1 > R2$, both of said terminated polyols having an average [[of]] functionality of 1.5-8, said terminated polyols being in solution and with at least 1% of said solution comprising free polyisocyanate of reactivity R1.

48. (currently amended) The ~~biocompatible-biocompatible~~ composition as recited in claim ~~48~~ 47 wherein one of said polyols is terminated with an aromatic polyisocyanate and another of said polyols is terminated with an aliphatic polyisocyanate, both of said polyols of functionality 1.5-8, said terminated polymers in solution with at least 1% of said solution comprising free polyisocyanate.